code. A vector comprised of six body regions, where a digit indicates the presence of an injury in that region and a hyphen denotes no injury in that region was created. This vector, called MIP, is used as a categorical patient characteristic that is analyzed as would any other variable. Data from the 2006 Lebanon war was used to demonstrate the benefits of the application of this approach.

**Results:** This method enables the association of morbidity and mortality more accurately to the exact profile of a complex injury, clarifying the obscured "multiple injury" diagnosis that resulted in loss of information.

Data on 689 soldiers injured or killed in the 2nd Lebanon War was used to demonstrate the application. The fatality rate among casualties with only head injuries was 10%, among isolated chest injuries, 12% yet, among combined head and chest, it was 71.4%. Previously, this information would have been lost.

**Conclusions:** The use of MIP enabled the production of a more comprehensive picture of injury due to the detailed recording of injuries that were previously concealed as part of "multiple". The MIP demonstrates that some combinations of injuries are more deadly, indicating causes of mortality previously masked due to the general category "multiple",or the association with one of the components.

**Keywords**: multiple injuries
*Prehosp Disaster Med*

## Analysis of Preventable Deaths According to Post-Mortem Reports in Traumatic Deaths

*Murat Durusu;[1] Mehmet Eryilmaz;[2] Mehmet Toygar;[3] Ersin Baysal[4]*
1. Emergency Department, Diyarbakir Military Hospital, Diyarbakir, Turkey
2. Emergency Department, Gata Faculty of Medicine, Ankara, Turkey
3. Forensic Medicine Department, Gata Faculty of Medicine, Ankara, Turkey
4. Council Of Forensic Medicine, Diyarbakir, Turkey

The aim of this study was to investigate the preventable deaths due to trauma after autopsies and postmortem examinations were performed at the Diyarbakir Council of Forensic Medicine.

In this retrospective study, descriptive, demographic, type of injury, cause of injury, locations of injuries, cause of death, and scene of death data were examined using the reports of the deaths due to trauma at the Diyarbakir Council of Forensic Medicine between 01 January 2008 and 31 December 2008. Medical errors in these deaths and preventable deaths were analyzed using these data.

Of the 747 cases considered, 31 (4.15%) were preventable, 121 (16.20%) were potentially preventable, and 595 (79.65%) were unpreventable. Suboptimal care in 75 (49.34%), delay in treatment 63 (41.45%), missed diagnosis in 16 (10.53%), clinical judgment error in 16 (10.53), missed medical administration in 11 (7.23%), and other mistakes in 6 (3.95%) of the cases have been found.

When the results were compared with the other studies performed in areas where modern trauma care and trauma centers are located, the preventable death were high. As a result, forming modern trauma system and trauma centers have a significant role in decreasing the preventable death ratios.

**Keywords**: autopsy; forensic science; preventable death; trauma
*Prehosp Disaster Med*

## Survey on Willingness of Emergency Department Staff to Work during Mass-Casualty Events

*Dr. Juliana Poh; Dr. Seth Puneet*
Singapore Health Services, Singapore

**Introduction:** The availability of healthcare staff is vital to effective disaster surge response. Factors likely to affect willingness of staff to work during disasters have been studied in the West. Having experienced high staff turnover during the 2003 severe acute respiratory syndrome (SARS) outbreak in Singapore, the aim of this study was to examine such factors in the Asian context.

**Methods:** Using a self-administered questionnaire, the aim of this study was to gauge the factors influencing willingness of emergency department staff to work during different disasters and possible incentives to improve turn-up rate. Responses were anonymous.

**Results:** Twenty-six questions were posed to 206 respondents. During a disaster, only 25 (12.1%) would consider resignation. Of these 25, likely triggers for resigning included long working hours for 16 (64%), use of uncomfortable equipment for 16 (64%), enforcement of compliance with protocol for 11 (44%), and communicable disease outbreak for 21 (84%). A total of 202 (98%) would be interested in receiving training for their role in a disaster. Factors affecting willingness to work included fear and concern for family (139; 67.4%), fear and concern for self (82; 39.8%), personal health problems (75; 36.4%) and childcare/eldercare issues (72; 34.9%). A total of 175 (84.9%) would be encouraged to work with a pay increment. The average increment expected was 46% (range = 5–300%). Participants were most willing to work after a building collapse and least willing to work during a chemical disaster or radiation accident. If incentives were offered, the most popular ones would be insurance for death/injury and extra payment per hour, followed by transport facilities, tax rebates, and volunteers for family care.

**Conclusions:** While most staff are likely to continue working during a disaster, willingness to work can be enhanced if barriers are removed and incentives offered. These findings have significant implications for community and organizational emergency planning and policymaking when resources are limited.

**Keywords**: emergency department; limited resources; mass-casualty incident; personnel; willingness to work
*Prehosp Disaster Med*

## Glycemia: A Means of Triage during Emergencies

*S. Abrassart; P. Hoffmeyer*
Hopital Universitaire de Genève, Geneva, Switzerland

**Introduction:** Improved survival rates of patients with multiple injuries have increased the general interest in the quality of polytrauma management. A special and simple score is needed for the triage of the polytraumatized. The

purpose of this study was to observe the polytrauma population and to correlate lesions with initial blood sugar.
**Methods:** A prospective study was conducted of 204 patients polytraumatized between January 2006 and December 2007; this database is in conformity with the ethics committee. Patients were selected according to the admission code "polytrauma" with National Committee on Aeronautics Score System (NACA) score ≥4. Blood analysis was performed as soon as the patient arrived. For each patient, the Injury Severity Score (ISS) was compared to the blood sugar level.
**Results:** The ISS and glycemia curve demonstrates a linear relation between the two values, especially for blood sugar concentration <8. Abdominal injuries always increase the level of blood sugar. Simple limb trauma or spine fracture did not impair glycemia, except when associated with open wound fractures, compression syndrome, or paraplegia. The average glycemia of pelvic trauma was 9.0 and the average ISS was 41. Head injury associated with abdominal or thoracic trauma always enhances glycemia when there are life threatening lesions associated. There was no correlation between ISS and age or sex.
**Conclusions:** High glucose levels may indicate serious lesions according ISS levels; this correlation provides valuable information for prehospital triage and transfer to the best hospital system.
**Keywords:** blood sugar; glycemia; Injury Severity Score; polytrauma; triage
*Prehosp Disaster Med*

### Resilience of Hospitals in Crisis

*Major Ilana Gens, RN, MPH, MOccH*
Israel

**Introduction:** The health system and general hospitals in Israel constitute one of the main pillars for preparing for emergency situations and improvement of hospitals to cope with varying threats.
**Background:** The 2nd Lebanon War and the ongoing confrontation around Gaza brought a significant change in the perception of threat, emphasizing the fact that in every conflict, the civilian home front will be one of the main objectives of injury.

Despite these high levels of preparedness, hospitals in northern and southern Israel found themselves in a long-lasting crisis situation. While they were under missile attacks, they were expected to be fully functional level. This long emergency situation was a real test of organizational strength and resilience, and emphasized the need for hospital functioning abilities as an essential and decisive component in creating and reinforcing a sense of resilience of the hospital.
**Proposed Model:** The literature offers several models that discuss dealing with resilience in three key parameters that affect the resilience: (1) personal safety; (2) family safety; and (3) knowledge/preparedness.

During Operation Cast Lead, the three parameters model, which included the following issues was adopted:

1. *Personal Safety*—In order to improve the level of protection in the hospital, the wards from last floors or one-floor buildings were transferred to shelters or other well protected areas;
2. *Family Safety*—Day care centers were opened within hospital facilities, to provide an adequate answer to disabled education system for the stuff children. One of such centers included >300 children for about three weeks, thus allowed to approximately 95% of stuff to continue their work; and
3. *Knowledge and Preparedness*—During routine hospitals are preparing emergency plans including the emergency deployment of their practice. The hospitals that have experienced this kind of emergency situation before managed by downloading hospital occupancy from 100% to 60% and transferring wards to protected areas in three hours.

**Additional Findings:** In addition to the parameters described above, several other components were found to be able to affect the hospitals resilience:

1. Independent, internal control and coping capabilities of the hospital;
2. Guarantee that essential workers stay in the hospital; and
3. Support of environmental factors including press.

**Summary:** Early and proper preparation of hospitals can affect all parameters affecting the resilience level of the hospital, which includes improving the level of protection, dealing with arrangements for child care, developing and drilling emergency plans, and guaranteeing that essential workers remain in the hospital.

The model was tested at two hospitals during a relatively small and limited conflict. More research required in more hospitals for the health system learning.
**Keywords:** hospital; Israel; preparedness; resilient; safe hospital
*Prehosp Disaster Med*

## *Collaboration in Disaster Management*

### Interagency Collaboration Topology for Counteracting Global Threats

*Fernando Galindo;[1] Elin Gursky;[2] Ron LaPorte;[3] Faina Linkov;[4] Alessandra Rosddodivita;[5] Eugene Shubnikov;[6] Elisaveta Stikova;[7] Andrey Trufanov;[8] Natalya Vinograd[9]*
1. University of Saragossa, Saragossa, Spain
2. ANSER/Analytic Services, Inc., Arlington, Virginia USA
3. University of Pittsburgh, Pitttsburgh, Pennsylvania USA
4. University of Pittsburgh Cancer Institute, Pitttsburgh, Pennsylvania USA
5. San Raffaele Hospital Scientific Foundation University, Milan, Italy
6. Institute of Internal Medicine, Novosibirsk, Russia
7. University "St. Cyril and Methodius", Skopje, Macedonia
8. Irkutsk State Technical University, Irkutsk, Russia
9. Danylo Halytski Lviv National Medical University, Lviv. Ukraine

**Introduction:** Counteracting global disasters and mitigating their consequences requires cooperative efforts of diverse national and international entities. Effectiveness of such cooperation depends on the information-sharing environment the agencies act within. In robust and productive information interaction that is reflected by its network topology is needed. The network topology is determined only by the graphical mapping of the configuration and connections between nodes (agency employees). This study